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AUTHOR Hezel, Richard T.
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ABSTRACT

Since 1987 Hezel Associates has studied how each of the 50 states is or is not coordinating the planning of technology, especially the use of telecommunications for education and related activities. The study documented telecommunications activities of state departments of education and higher education, boards of regents, boards of vocational and technical education, state universities that have formed pockets of technology within states. Based on this research, it is recommended that policy issues concerning technology be formed at the same time that uses in educational technology are being developed. Some of the policy issues to be considered are: (1) the locus of planning, e.g., who establishes technological goals for the classroom; (2) economics and funding, specifically, different sources of funding, availability of funding, and the ways in which funds may be used; (3) technology planning, in which information about the availability and practicality of different technologies is considered; (4) state policy, which is particularly important because of the impact it has on agencies and institutions dependent on state funding; (5) governance and development of guidelines for educational technology; (6) system management, which determines the uses of, entrance into, and access to a system; (7) instructional programming; (8) faculty involvement in the planning and implementation of technologies; and (9) pedagogy and impact on teaching and learning. It is concluded that policy priorities can be established after consideration of these issues, and a coherent approach to educational technology may be developed. (20 references) (DB)

Policies for Educational Technology: A National, State, and Local Agenda

Richard T. Hezel, Ph.D.
President, Hezel Associates

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Policies for Educational Technology: A National, State, and Local Agenda

INTRODUCTION

This paper is based on research undertaken by the author during the last three years on the issue of educational telecommunications policies. Some of the impetus for the research came from the Annenberg/CPB Project, which has supported a biennial report on statewide planning for educational technology.

Since 1987, Hezel Associates has studied how each of the 50 states is or is not coordinating the planning of technology, especially the use of telecommunications for education and related activities (Hezel, 1987, 1990). In the studies, telecommunications activities of state departments of education and higher education, boards of regents, boards of vocational and technical education, state departments of telecommunications, and schools, colleges and universities that have formed pockets of technology within states were all documented. To some extent, consortial work of educators with departments of economic development, commerce, corrections, health, and social services have also been noted.

This paper is also based on contract work with the Office of Technology Assessment for its recent report, Linking for Learning (U.S. Congress, OTA, 1989), as well as planning work undertaken for education agency clients in various states.

In the Fall, 1988, Council of Chief State School Officers State Technology Leadership Conference at Charlotte, the considerable efforts of many attendees resulted in the development of a report and recommendation of policy issues that required the

attention of the Chiefs and other key people who influence national and state telecommunications policies (Council of Chief State School Officers, 1988). This presentation has also incorporated and expanded on some of the ideas that emanated from that meeting as well as many other ideas that have originated from educational technology representatives in the states.

WHY DEVELOP TECHNOLOGY POLICIES?

The need for a consistent method of treating the development of technology has been apparent for at least the last several years. Some states, like Virginia and Utah, have been relatively advanced in the development of policy concomitant with the statewide development of technology. Other states have developed technology quickly, but have failed to articulate policy to guide the technology and its uses. The coincidental development of policy and technology permits a system for making principled judgments about the appropriate uses and the growth of technology, and technology policy assists in making recurring decisions about issues of public importance. As a result of clearly stated policies, "seat-of the-pants" decisions that often lead to inequities are avoided, and decisions that have no basis in planning are avoided. There are also many other practical and ideological reasons for policy development. Hansen (1987), for example, points out that saving small schools through distance education requires an acceptable rationale and some policy development.

SETTING THE AGENDA FOR POLICY DISCUSSION

The need for leadership in educational technology development and policy has been readily apparent for some time. Where no clearly stated educational technology policy exists, planning tends to be scattered, and technologies are often implemented more haphazardly. Where technology planning is unified by policy, the likelihood of unified funding and cost reduction is enhanced.

Policy leadership may arise predominantly at the local level, at the state level, or at the national level from, for example, the U.S. Department of Education, from a federation of interested individuals, or from a central organization such as the Council of Chiefs. There is evidence that statewide telecommunications planning has been on the ascendancy during the last three years, but a debate rages in some states over whether planning should be local in nature to meet specific needs of local schools or regional to capture economies of scale in technology purchases. The ideal may prove to be to develop generalized policy and funding at the federal level, with a central core of policy and technology planning at the state level, to guide local technology decisions and implementation.

IDENTIFYING THE MAJOR POLICY ISSUES

The policy issues have changed over the last several years, but most of the issues that surfaced in the 1988 CCSSO technology policy discussions have not been resolved. Many of the issues are treated in the report on statewide telecommunications coordination for Annenberg/CPB (Hezel, 1990), and some of the issues have also been discussed in the recent OTA report, Linking for Learning (U.S. Congress, OTA, 1989).

The major telecommunications policy issues are interconnected, and they must be treated in context with one another. The issues are separated here for conceptual clarity.

LOCUS OF PLANNING

The quality of technology systems depends, in part, on which organization provides leadership for planning. The planning models are diverse, and each has its strengths and weaknesses. There is evidence of a growing desire to adopt planning models from states that have exhibited the greatest success in their distance learning systems.

It is also evident that the success of any technology intended for classroom use is substantially dependent on the involvement of teachers in the planning. More and more states are including teacher representatives in the planning process, and no planning should be undertaken without teacher participation.

Of equal importance with the locus of planning are the goals established for the system and their clear articulation. The goals often reflect the system planners' orientation to education. Therefore, where coordinated planning is envisioned, goals should be created by consensus among the planners. The establishment of goals often leads directly to prioritizing the goals and the development of strategies to be used in the implementation of the plan. The strategies are derived from the confluence of needs, goals, target student characteristics, curriculum with past evaluation research and distance education telecommunications experience.

The observation and study of successful and unsuccessful distance education projects in the U.S. leads to several conclusions regarding planning phases and strategies to be undertaken. Using the state of Minnesota as a model, states may wish to require that technological planning satisfy established criteria before funding will be considered. Planning should include a thorough needs assessment; clearly defined goals and objectives; the demonstration that technology offers cost-effective and efficient means of reaching objectives; a technical feasibility study; a description of system coordination and management; evidence of local financial support; a 3-year projection of use, clientele, support, maintenance, training, costs, revenues; evidence of faculty involvement in planning; opportunity for cooperation of neighboring institutions; and capacity to link to appropriate statewide telecommunications networks. States should also assure that the system addresses future needs for expansion, and includes a plan for evaluation (State of Minnesota Task Force on Instructional Technology, 1988).

ECONOMIC AND FUNDING ISSUES

One of the most vexing problems in distance education in the U.S. today is the lack of funding for far-reaching (or even conservative) visions of education and technology. Many individuals and organizations are prepared to describe in great detail the technological classroom of tomorrow--and in many of the scenarios the technology is currently available. And as usual, visionary plans are thought to be expensive. The telecommunications plan for Iowa at $120 million or the Star Channels plan for Kentucky

at a price of $85 million are viewed by some citizens and legislators as outlandish in cost, especially for states where per capita income is below average.

Funds specifically for distance education and technology are extremely limited for implementing the visionary systems or even the not-so-visionary, but needed, technologies. In general, the federal government, across all agencies, has more dollars set aside for technology uses and the support of technology than most states, but there are many organizations competing for pieces of the pie. One of the most visible of the federal programs, Star Schools, will release $14.8 million directly to four or five fortunate consortia. Through its Public Telecommunications Facilities Program, NTIA assists in the purchase of equipment, but much of the money will go to individual organizations such as public television or radio stations or to colleges for the development and improvement of broadcast facilities. In total, federal expenditures for educational technology are paltry in comparison with the need and goals to be reached by the year 2000.

The availability of state funding varies wildly from state to state. In Iowa, a state that has a firm resolve to take ambitious steps toward the development of educational telecommunications, the legislature has been willing to risk substantial funding on the system. By contrast, the state of Montana, which needs distance education technologies to cover sparse school populations dispersed throughout the large area, has yielded just $500,000 for a feasibility study and for implementation.

State legislators are faced with hard decisions about whether to rely on general revenue funds for learning technologies or to make a long-term, large-scale investment

in education by floating bonds. Using general revenue funds for ambitious technology packages usually results in tax increases. And sizable tax increases are never popular, but they are even less palatable in times when many states are running deficit budgets. Bond issues are sometimes politically easier mechanisms to finance technology, but in times of increasing public scrutiny regarding deficit financing, the bond issue is becoming a riskier resolution. Furthermore, politicians are justifiably concerned that the technologies supported may become obsolete before the bond issue has been repaid.

Several other types of funding are available, including grants from philanthropic organizations, corporate sponsorship, leases and vendor relationships, in-kind funding among participating institutions, and fee generation from technology users (cf. Goldstein & Woolsey, 1987). Among these, the most promising and durable funding comes from the establishment of business-education consortia sharing technologies. Business training needs are expected to increase dramatically during the next 10 years, and the American Society for Training and Development is forecasting that many businesses will need technology and telecommunications to complete the training tasks. This decade, then, would be expected to be an ideal time for schools and state education agencies to link with businesses in the formation of educational collaboratives.

TECHNOLOGY ISSUES

National and state policies are also urgently needed for technology planning and implementation. For example, the federal and state governments can assist in providing technology information about which technologies are currently available, which are

practical, which are obsolescent, and which have a solid future. States can best support the statewide inventory of technologies and telecommunications systems within the states (e.g., Michigan State Board of Education, 1989), and the state level is most appropriate for undertaking a survey of educational applications of communications technology within the state (Nelson & Sommer, 1989). States can also be instrumental by providing districts with a master technical plan for the entire state and by developing standards and protocols suitable to member institutions. Yet, the states should avoid the designation of specific statewide technologies, in favor of using the most appropriate technologies for the variety of stated needs (Colorado Commission on Higher education, 1990). It is further recommended that the establishment of any new technology infrastructure should be based on the combined needs for instruction, instructional support, and management applications (New York State Education Department, 1989). Technology planning should be integrated into the planning of entire educational curricula and school restructuring.

Like Virginia, states should also establish policies that permit the funding of technologies that have been demonstrated to be cost-effective, flexible, expandable, and accessible to users at convenient locations, and technologies that provide services which allow for statewide distribution of quality and effective instructional, research, and public service programs provided by the educational community (Virginia Department of Information Technology, 1985).

Both state and federal government need to review telecommunications regulations and policies in light of how the regulations affect the potential for delivery of

educational resources. In particular, education agency staff should work with state and federal regulatory bodies to study and possibly remove barriers to the development of integrated broadband networks by local exchange carriers (Gallagher & Hatfield, 1989).

In the development of a new educational telecommunications service, policies are needed about the applications of technology and telecommunications, the integration of media for instruction, and the types of services (e.g., voice, data, video) that are to be provided.

STATE POLICY ISSUES

Among all levels of policy-making, state policy and its implementation is probably most important because state technology policy has far-reaching impacts on agencies and educational institutions that are dependent on state funding. At the state level, numerous issues need to be resolved for the satisfactory implementation of educational technology. Therefore, state planning bodies should make strong recommendations to the governor and legislature regarding the adoption and funding of technologies in the schools. (e.g., Minnesota Higher Education Coordinating Board, 1989)

The involvement of the governor's office in planning for technology appears to be critical (Hezel, 1990; National Governors' Association, 1988). State legislatures can also have a central role in technology development by developing a statutory basis for telecommunications planning. Statutory actions include establishing a high level telecommunications commission, vesting the commission with authority to govern technology planning and implementation, and providing the commission with expert

consultation. Legislation that develops uniform authorization requirements and that vests one agency with authority to review educational telecommunications may also be helpful. The planning and use of technology are enhanced when, by policy, a state agency provides a mechanism for the exchange of information about technology. Assignment should be made to one state agency--such as a division of telecommunications--to facilitate telecommunications consortium building and to another agency--such as the department of education--to work with institutions to develop criteria for quality programs. Still, a policy decision should be made regarding the locus of program authority--either at the state level or at the local institution.

Policy is needed that defines the state's position regarding the importation of interstate educational telecommunications. Either at the federal or at the state level, there is an urgent need for guidelines governing courses and instruction that cross state lines (England & Bowman, 1988) and policies to guide the conditions for the acceptance of technology-based instruction from out-of-state institutions operating within any state.

GOVERNANCE ISSUES

The preceding policy issues are critical to planning and establishing distance education telecommunications service. Governance is critical to the continuing successful operation of the system. Governance issues are sometimes thorniest for technology users, and rank behind only funding and planning as most problematic issues identified by state telecommunications

coordinators (Hezel, 1990). At issue is the establishment of a structure for telecommunications coordination activities and how the coordinators are chosen, their decision-making responsibilities and reporting functions. Governance problems most often occur at the state level as organizations compete to exert influence over system development. Many states have no laws regarding governance of educational technology or mandating governance to an agency or commission.

The resolution of the problem can most likely be found at the state level also, but state education agencies, telecommunications divisions, legislatures and governors' offices should develop management model that will suit all participants and will further the goals of the system and its coordination. The objective of the management model should be to avoid duplication of efforts, to reduce capital and operating expenditures, and to avoid redundancy in technology implementation.

The management model should also address how decisions are to be made regarding the development and dissemination of product or programming. Governance policies are needed that enable the development of guidelines for a multi-institution plan for technology coordination and administration.

The most effective management often comes through the formation of a statewide technology or telecommunications council, for which an operating policy should be established. The policy should articulate the goals and responsibilities of the council, its members, and the institutions they represent, the term of participation, who heads the council, to whom the council reports, among many other policy issues.

SYSTEM MANAGEMENT ISSUES

Closely associated with the governance of technology planning and implementation is the post-implementation management of technology, especially where a telecommunications system has been implemented. The use of technology requires a vision for education, and, based on the vision, a mission statement and a set of goals statements and objectives are prepared. The mission statement becomes the foundation for a long-range or strategic plan (eg., Texas Education Agency, 1988; Kansas Board of Regents, 1989), and the goals are the basis for an action plan.

Policy-makers need to consider what is the range of uses of the system, whether the technology or system will be used for education only or for corporate training also, and whether the system will be used exclusively for higher education or exclusively for K-12 education, or whether vocational-technical education is to be integrated into the system.

Policy decisions need to be made about the area of coverage of the system, which institutions are to have access to the telecommunications system, what are the conditions for joining the system, which institutions are to be transmit and receive sites, who has responsibility for maintaining network and local components of the system. Responsibility for staffing and training system users must also be assigned through policy.

PROGRAM ISSUES

Instructional programming to be delivered on a telecommunications system should conform to some predetermined quality review criteria that are clearly established in a policy statement. In addition, policies are needed about who decides what courses or materials will be produced and disseminated, who will produce the materials, how they will be distributed, how production and distribution priorities are established, and how decisions are to be made about course or material changes.

FACULTY ISSUES

Policies regarding the involvement of faculty in technology planning and implementation are among the most important to be treated in a cogent body of technology policy. Inadequate training for faculty and staff in distance learning and telecommunications teaching has been identified as a barrier to the use of telecommunications for instruction (e.g, Educational Telecommunications in Utah, 1987). If technologies are to be used effectively in classrooms of the future, schools and colleges need to be funded to provide technology education to future teachers. In addition, teacher in-service training should make extensive use of technology (California Postsecondary Education Commission, 1989). Teachers and their unions should be represented in technology discussions and planning sessions.

Policies about teachers' workloads in the face of integration of technologies in the classroom need to be formulated. Decisions about whether teachers receive compensation or course reductions for technology integration must be made. Policies

should take into account how the teacher's use of technologies and the preparation of instructional materials for technologies affect hiring, tenuring, and salary levels. Intellectual property rights for courses and instructional materials that are used beyond the teacher's classroom walls must be assigned. Every level of educational institution should set as one of its personnel objectives to find, identify and recruit faculty who are good teachers and who are enthusiastic about teaching via telecommunications. Teachers should be offered every opportunity for in-service professional development in the integration of technology and the curriculum.

PEDAGOGICAL ISSUES

Technology implementation requires the consideration of policies regarding conditions for learning, such as age, time requirements for utilizing technology in the classroom, requirements for site preparation, class size, formative testing of the system, instructional design, learning styles, and instructional strategies.

In addition, support services to be offered to students, faculty and administrators should be described in the policy-making. Opportunities for teacher-student interaction through two-way technology, tutorials, and e-mail should be identified. Student access to libraries can be arranged through local libraries, and academic counseling services should be available to off-site learners as well as local learners.

IMPACT ISSUES

There should be a commitment to an on-going evaluation of the effectiveness of technologies in schools. The evaluation should be undertaken at key points in the

development of the system and should include assessments of the technologies, delivery methods, instructional strategies and techniques, and the economic efficiency of the distance learning system (England & Bowman, 1988). The comprehensive policy should include a statement of commitment to the assessment of technology impacts. Effects on primary users, such as students, teachers, and administrators, should be measured. Actual impacts should be measured against expected or criterion levels established during planning and goal-setting. In general, the evaluation should include formative and summative assessments of: (1) uses of the technology, the environment of uses, ease of use, and persistence of attention to task; (2) learning measures, including recall, comprehension, and skill development; and (3) affective measures of attitudes toward the technology and its programming. Finally, an evaluation of how the technology affects changes in the curriculum should be undertaken.

Aside from research on the impacts of particular technology in particular settings, some policies may address the need for research to assess the current needs of potential users of the technology. In addition, some research may be warranted that leads to improved strategies in using the technology, as well as basic research that provides generalizable information about the use of technologies.

A NATIONAL AGENDA FOR SUPPORTING EDUCATIONAL TECHNOLOGY AND TELECOMMUNICATIONS

As noted above, the locus for much of the planning and policy-making has been state agencies and local institutions. Aside from Star Schools and scattered other grant

programs, the federal government, especially the U.S. Department of Education, has been noticeably absent from the development of educational technology. National organizations, such as the Council of Chiefs and the National Governors' Association, have expressed occasional--and what appear to be temporary--interest in school technology and educational telecommunications, but their interest has failed to result in significant impacts at the national level.

Federal policy on the support of educational technology is urgently needed to assist states in planning. Such policy should be designed to provide a coherent approach to planning and funding technology development. Any national organization should establish as policy priorities regarding the support of technology. The priorities are:

1. Support projects that aggregate institutions for planning and implementation.
2. Support projects that have state government support.
3. Support projects that have the potential to provide telecommunications leadership.
4. Support projects where technology and experience can be shared.
5. Support projects that demonstrate innovation in the use of technologies.
6. Support projects that demonstrate openness to divergent technologies.
7. Support projects that demonstrate an affirmative commitment to evaluating project goals against specified criteria.
8. Support projects that demonstrate an affirmative interest in sharing research data and results.

9. Assist states and local school districts by providing strategies for funding distance education.

10. Undertake research on the economics of distance education and share findings and strategies from the study.

11. Encourage the development and expansion of educational telecommunications consortia that can increase the uses of available materials.

12. Establish a series of publications to assist state and local education people understand the issues to be confronted in adopting technology and developing a distance learning system.

13. Establish a series of meetings to assist state and local education representatives plan for the adoption of technology and telecommunications.

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